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7 **PRINTER APPLICATION ADAPTER SYSTEM**
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3 **PRINTER APPLICATION ADAPTER SYSTEM**

4 Your Petitioners, Roland F.A.M. Korst and
5 A.A.M. van Swaij, citizens of The Netherlands and a
6 residents of The Netherlands whose residence and post
7 office address are Bizetlaan 1, 5251 HA Vlijmen, The
8 Netherlands; and, Broek 11, 6652 EH Druten, The
9 Netherlands; and, Ronald R. Norton, a citizen of The
10 United States of America and a resident of Orange
11 County, in the State of California, whose residence and
12 post office address are 53 Sparrowhawk, Irvine,
13 California 92604 pray that letters patent may be granted
14 to them for the invention of a **PRINTER APPLICATION**
15 **ADAPTER SYSTEM**, as set forth in the following
16 Specification.
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BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The field of this invention resides within the printer art relating to printer controls and the use of certain programs. More specifically, it resides within the area of using a printer and adapting the printer to utilize a former program of a relatively non-compatible printer. The former program is modified and allowed to run the new printer or substitute printer in a suitable manner with incorporation of a prior system or program.

1 BACKGROUND OF THE INVENTION AND PRIOR ART

2
3 The prior art with regard to controlling
4 printers such as line printers, thermal printers, and
5 laser printers through a pre-established program is a
6 relatively broad area. It incorporates numerous
7 programmatic systems and concepts. Many printers are
8 established with a particular program for utilization
9 therewith. The program is specifically adapted to
10 certain print functions and applications. These print
11 functions and applications can be derived from a host
12 computer, or within the printer itself.

13
14 Such host computer controls and related
15 programs for the driving of a printer are well known in
16 the art. These programs from the host computer are
17 usually derived by a programmer to establish a printout
18 of a particular type of print formation. This print
19 formation can be related to bar codes, printing jobs
20 with regard to invoices, reports, and multiple other
21 functions that the host computer undertakes to control
22 through its pre-established printing programs.

23
24 Such pre-established programs resident in the
25 host computer or even in the printer can be associated
26 with other computers for controlling printers. This can
27 be combined on a network such as a network within a
28 specifically hard wired internal or external system. It

1 also applies to a network for controlling printers
2 through the established internet functions and systems
3 that can be placed on and off line to control remote
4 printers and other equipment through a computer
5 including a printer's host computer.
6

7 A major problem with many programs as
8 established through prior programmatic efforts to
9 control a printer is they are difficult to modify. This
10 is due to the fact that oftentimes programmers use
11 specific language and inputs that they are aware of and
12 which are not commonly used in a broad program language
13 spectrum. Although, the input functions of the
14 programmer might be limited in scope, they can
15 nevertheless cause a particular program for a particular
16 printer to be generally printer specific.
17

18 It is difficult for a large organization
19 having multiple printers that have been programmed with
20 a multiplicity of different programs to change all the
21 printer programs. This is true whether they be in the
22 host or the printer itself or other computer or
23 processor when establishing a new printing function or
24 to adapt them to a new printer.
25

26 In order to remedy the problem, this invention
27 utilizes a specific printer application adapter (PAA)
28 through the system and/or software, or a particular

1 printer. This is used in conjunction with a character
2 substitution table (CST) which changes key characters or
3 other elements of a particular program which must be
4 adaptable to a particular printer or series of printers.
5

6 The invention hereof establishes a character
7 substitution table (CST) for utilization with a printer
8 application adapter (PAA) of this device. These can all
9 be utilized with a program which manages the printer
10 from a remote or proximate location.
11

12 The net result is to allow an older printer
13 program for a printer to be incorporated with a new
14 application, new printer, and/or a new output which is
15 specifically adapted for such new applications.
16

17 Consequently, this invention is a step forward
18 for adaptation of older programs for disparate printers
19 for printing new printer outputs of various types
20 through a prior existing program.
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SUMMARY OF THE INVENTION

In summation, this invention incorporates a printer application adapter which modifies a former printer program through a character substitution table so that an output for the printer can be established with a modified prior program.

More specifically, the invention hereof provides for the ability to systematize or adapt old programs or other disparate programs for controlling new and other types of printers for various printing jobs. The function is provided through a printer manager managing system which creates a character substitution table for the specific characters of a prior program. These characters are then changed to effect the new printing output that is required.

A prior printing system or program is sent to a particular printer application adapter. This printer application adapter can be in the hardware or other process or capability of a printer. The printer application adapter receives the character substitution table that has been stored in non-volatile memory. It is then transmitted to the printer controller for controlling a specific output. The net result is a modified output from the original program evolving from the character substitution table that has been applied

1 by the printer application adapter for the modified
2 application.
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BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a perspective view of a dot matrix line printer that can be used with this invention.

Figure 2 shows a cross-sectional view of the hammerbank of the line printer shown in Figure 1 along section lines 2-2 of Figure 1.

Figure 3 shows a partially fragmented side elevation view of a thermal printer which can be used with this invention.

Figure 4 shows a block diagram of the system utilizing this invention.

Figure 5 shows an example of what would happen in a program of a system utilizing a new printer that has not been adapted by the invention hereof.

Figure 6 shows a simple illustration of a diagram of a method for modifying a program with this invention.

Figure 7 shows a modified printer output based upon the modified printer program of this invention.

1 Figure 8 shows a block diagram of the prior
2 art of a printer without the printer application adapter
3 of this invention.

4
5 Figure 9 shows a block diagram of a printer
6 application adapter utilizing this invention.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

In order to describe the printer system hereof, two examples of printers for which this invention can be utilized will be set forth.

The first example is in Figures 1 and 2 in which the aspects of a line printer which can be a line dot matrix printer or other type of dot matrix printer can be utilized. The line printer of Figure 1 will be designated with odd numerals.

Looking more specifically at Figure 1, the line printer 11 can be shown having reels 13 and 15 from which a ribbon is respectively unwound and wound for printing purposes. The line printer 11 in particular has a control panel 17 with a number of switches to input the various operator commands and programs from a menu or from any other control source in or out of the printer.

The printer 11 has a controller therein which is not seen but is a processor which can control the printer in the manner set forth hereinafter.

The printer 11 is formed with a case having a lid 19 hinged with brackets such as brackets 21 on either side.

1 A paper feeder in the form of a paper feeder
2 25 having tractors 27 on either side feeds paper across
3 a paper support 29.

4
5 A horizontal adjustment knob 33 is shown with
6 a vertical position knob 35 to orient the paper both
7 horizontally and vertically.

8
9 The printer 11 incorporates a forms thickness
10 lever 37 which can be opened and closed or moved to
11 accommodate various thicknesses of forms or media that
12 is to be printed upon.

13
14 Finally, a printer mask 41 is shown which
15 masks the print ribbon from the media being printed upon
16 as will be seen in the cross-section shown in Figure 2.

17
18 The ribbon mask 41 as shown in Figure 2 is in
19 conjunction with a platen 43 which can be moved by its
20 support 45.

21
22 A hammerbank 47 is shown having tips 49
23 connected to the ends of hammers 51 supported on a
24 spring arm 53 that has been formed on a fret of hammers
25 55.

26
27 The hammerbank incorporates a hammerbank cover
28 57. A ribbon 59 is fed between the reels 13 and 15.

1 As is known in the art, the hammers 51 are
2 released from a permanent magnet retention by electro-
3 magnetic coils. The coils overcome the permanent
4 magnetism for release of the hammer tips 49 in order to
5 make an impact against paper 61. The paper 61 is fed
6 through the space between the platen 43 and the tips 49
7 of the hammerbank.

8
9 The hammerbank 47 oscillates backwardly and
10 forwardly for releasing the hammer tips 49 in a
11 consistent manner for printing against the paper 61. In
12 this manner, with the controller in the printer 11,
13 printing can take place by the controller receiving
14 signals from a host for the various printing functions
15 that are to take place.

16
17 Looking at the apparatus of Figure 3 it can be
18 seen that a thermal printer 10 has been shown with a
19 case constituting a base portion 12 having legs 14 upon
20 which it stands. The base portion 12 forms the base for
21 back wall 16 and cast drive support wall 18 that is in
22 the form of a casting. The casing is covered by a
23 hinged lid that is not shown but wherein the hinges 20
24 attached to the lid are shown.

25
26 In order to provide media to print on, a media
27 support rod, bar or rack 36 has been provided to support
28 a spool of media. The bar 36 is connected to the wall

1 18 in a rigid manner and is supported rigidly based upon
2 the strength of the casting of the wall 18. A media
3 roll or spool 38 is on the bar 36. The roll or spool of
4 media is supplied initially on a tube or cylinder 39.
5 The support of the media spool 38 is rigidified by a
6 bossed portion 44 of the casting. The media can be a
7 roll of paper, plastic, or tear off labels on an
8 underlying sheet.

9
10 The media support rod 36 allows for the media
11 to be transported by being pulled by and driven over a
12 cylindrical platen 48. The platen 48 can be a hard
13 rigid elastomeric roller member which rotates and is
14 driven by a drive mechanism within the casing. As the
15 platen 48 rotates it pulls the media in the form of a
16 media strip 52 in a manner so that it is supported under
17 tension with a pivotal foot 54.

18
19 These labels can be seen as the end printed
20 product 60 moving outwardly away from the platen 48
21 after printing. In order to retract the underlying
22 portion of the media 52 after the labels 60 have been
23 removed therefrom, the remaining media underlying the
24 labels 60 is coiled around a spindle 64.

25
26 In order to make an imprint upon the media 52,
27 a thermal head 74 is provided. The thermal head 74 has
28 a number of heating elements that provide a multiplicity

1 of dots per inch across its width. These dots provide
2 dot matrix printing by heating the print ribbon. The
3 printing head is supported on a support 76 and extends
4 backwardly on a bracket 78 attached to a pivotal member
5 and pin 80.

6
7 The media spool 38 provides a strip 52 over
8 the platen 48 and under the print head 74. This is in
9 association with a print ribbon, or film 120 delivered
10 from a print ribbon roll or spool 122.

11
12 After the print ribbon 120 has passed between
13 the print head 74 and platen 48, it moves upwardly. It
14 is then wound on a take-up roller or spindle 162. The
15 take-up roller or spindle 162 can be seen with a tube of
16 cardboard 164 upon which the print ribbon 120 is wound
17 in the rewound condition.

18
19 From the foregoing, it can be seen that a
20 thermal printer 10 of this invention has been generally
21 described for operation with the system and program of
22 the printer application adapter.

23
24 The thermal printer 10 is such where it
25 incorporates a controller to control the functions of
26 the thermal printer. The thermal printer controller and
27 the controller for the line printer shown in Figures 1
28 and 2 will be generally referred to as the controller

1 which can also be used with a laser printer. It will be
2 numbered with a like number inasmuch as it is a printer
3 controller. The printer controller is in relation to
4 the thermal printer 10, the line printer 11, a laser
5 printer, or other type of dot matrix printer.

6
7 Looking more specifically at Figure 4 and the
8 ancillary figures, it can be seen that a block diagram
9 has been shown.

10
11 Block diagram 4 first of all shows a computer
12 block 100. The computer 100 incorporates a printer
13 manager system (PMS) 102. This printer manager system
14 (PMS) 102 can be any program, or other device for
15 managing a printer program or programming or re-
16 programming it. The printer manager system 102 can be
17 incorporated within a computer 100 which can be the same
18 as a host for the printer.

19
20 The computer 100 with the printer manager
21 system which is shown as printer manager system block
22 102 incorporates the capability of changing or entering
23 into a character or establishing a character
24 substitution table (CST) 104. The character
25 substitution table 104 fundamentally utilizes the
26 concept of substituting specific characters in a prior,
27 alternative, or non-compatible program. This provides a
28 proper printing function for a given printer that would

1 not directly interface with a prior or legacy printing
2 program.

3
4 The character substitution table (CST) 104 is
5 established in a manner shown in Figures 4, 5, 6 and 7.
6 In these figures, it can be seen that a character
7 substitution takes place by reprogramming a prior, or
8 non-compatible program of a particular printer's
9 application.

10
11 The particular printing application is shown
12 on a host computer 106 which incorporates a printing
13 application program 108. The printing application
14 program 108 is that of an established, prior, or ongoing
15 type of printing job which will be referred to
16 hereinafter as a legacy print job, prior printing
17 function, non-compatible program, or a different printer
18 program 110.

19
20 The host computer 106 is connected to the
21 printer 114 along with the input from the character
22 substitution table (CST) 104. The character
23 substitution table (CST) 104 has been inserted into a
24 flash file system 116 which can be a non-volatile memory
25 within the printer 114. The printer 114 which is either
26 the thermal printer 10 or the line matrix printer 11 or
27 for that matter any other type of printer (i.e. a laser
28 printer) is labeled as printer 114 which applies to all

1 printers.

2
3 Within the printer 114, is a processor which
4 is the printer application adapter (PAA) 118 processor.
5 The printer application processor 118 can be a stand
6 alone processor in the printer 114 or incorporated into
7 the printer's multi-purpose processor.

8
9 The PAA 118 when incorporating the CST imparts
10 it to the printer language controller 120 for
11 controlling the printer for a desired or newly
12 established printed output 122. It should be understood
13 that the printer controller 120, printer application
14 adapter (PAA) 118 and the character substitution table
15 (CST) 104 in the flash file system 116 can all be in one
16 particular processor and utilized effectively as the
17 single processor within the printer 114.

18
19 As a general explanation, the system and
20 invention hereof allows a user to obtain the print
21 results they desire without having to modify their main
22 printing application or the pre-established native
23 commands of the printer. In other words, the legacy or
24 prior print job 110 program in the printing application
25 program 108 does not have to be significantly modified
26 and can be used for a new printer or a series of new
27 printers. This is particularly helpful when replacing
28 an older printer with a newer printer that is not

1 exactly compatible with the previous printer.

2 Furthermore, it can be helpful where the newer printer's
3 language is different from the printer it is replacing.
4 This sometimes comes about with regard to nuances and
5 variances in programming techniques and functions.

6
7 In order to use the invention, the user first
8 examines the data sent from the main printing
9 application 108 when comparing the print results that
10 this data results in on the new or substitute printer
11 114. The user then determines which commands and
12 aspects of the data need to be changed to effect the
13 correct results.

14
15 After determining the data stream changes that
16 are desired, the user must create a CST 104. This is
17 done by using the CST editor in the printer manager
18 system (PMS) 102. The PMS 102 can be any particular
19 program which can edit and allow a change over of a
20 particular printer 114 of the particular type which it
21 is systemized to. The editor of the printer manager
22 system 102 allows a user to enter what they are looking
23 for in the data stream and what they want to do once it
24 is found. For example, items in the prior or legacy
25 print job 110 program that are found can be replaced
26 with something else. They can be deleted, they can
27 mark the beginning of an area to be deleted, or other
28 numerous actions as can be understood with regard to a

1 computer programming function and the desired output.

2
3 The CST 104 allows for many entries to be
4 provided for thereby accommodating multiple items to be
5 searched and acted upon that are to be changed in order
6 to characterize the legacy print job system 110 for use
7 with the new or different printer 114.

8
9 Once the CST 104 has been created, it must
10 then be sent to the target printer 114. Of course, the
11 target printer 114 can be such where downloads can take
12 place to multiple printers connected to other host
13 computers having similar legacy, prior programmed or
14 incompatible programmed print jobs 110. By using the
15 remote file download feature of a (PMS) 102 which can be
16 accommodated on any network including an internet
17 relationship, the file can be sent to the printer 114
18 and the printer then stores the file in its non-volatile
19 memory 116.

20
21 A user then inputs that the printer 114 should
22 be alerted as to the PAA 118 and to use the newly stored
23 CST 104. This step can be done locally through the
24 printer's control panel such as control panel 17 of the
25 printer 11. It can also be done remotely through the
26 PMS 102 that can be part of any particular computer,
27 including the host computer 106 for the printer 114.

1 Once the PAA 118 has been activated, it will
2 begin getting all data bytes sent to the printer 114
3 before the main language processor. It examines each
4 character or string of characters and looks for matches
5 with any entries in the CST 104. If nothing is found,
6 the PAA 118 passes the data along to the main language
7 processor without any modifications and thus the
8 controller 120 is provided with sufficient input to
9 create the desired output using the legacy print job
10 110.

11
12 If a match is found with some entry in the CST
13 104, the PAA 118 does not forward the matching data on
14 to the main language processor. Instead, it looks at
15 the specified action defined in the CST 104. For
16 example if the action is to replace, an item, the PAA
17 118 will discard the data that matched and replace it
18 with the new data defined in the CST 104. This new data
19 will now be passed on to the main language processor.
20 In this manner the data has been transformed to achieve
21 the desired print result from the legacy printer or
22 print job 110 without modifying what the main printing
23 application sent was and what commands the main language
24 processor understands.

25
26 Returning to Figure 4, it can be seen that the
27 system diagram shows the basis wherein the (PMS) 102 is
28 utilized to create the CST 104. Thereafter, the PMS 102

1 stores the CST 104 and then imparts it to the printer
2 flash file system or non-volatile memory 116.
3

4 The data is then sent unmodified from the
5 printing application 108. The PAA 118 reads the
6 substitution rules or changes from the CST 104 stored in
7 the flash file system or non-volatile memory 116. At
8 this point, the data stream is modified and forwarded on
9 to the printer controller 120. The foregoing activity
10 from the printer controller 120, which controls the
11 printer such as printers 10 or 11 produces the desired
12 print result or output shown as printed output 122.
13

14 In order to understand a simple example,
15 Figures 5, 6 and 7 should be turned to.
16

17 In the example it is assumed that an older
18 printer with a particular pre-established or
19 incompatibly programmed print job such as the legacy
20 print job 110 derived from a former program is being
21 replaced that uses the command bold to effect emphasized
22 type face printing. Inasmuch as the newer replacement
23 printer is not exactly the same, there would be language
24 difficulties. The replacement printer's native language
25 does not understand the "bold" command. In the
26 alternative it understands a command for "dark" that
27 yields the same desired result.
28

1 Due to the difficulties in modifying
2 complicated programs, it is deemed impractical to change
3 the original data stream of the legacy or incompatible
4 program. Furthermore, it is not possible to modify or
5 change the printer's native language. This invention is
6 used to obtain the desired results without having to
7 modify any software and is shown in the manner set forth
8 below.

9
10 Looking at Figures 5, 6, and 7, the process is
11 such wherein the data stream is sent to both printers
12 (i.e. compatible prior printer, and new incompatible
13 printer), and the result is observed. As seen in Figure
14 5, the data stream sent on the old printer is a "bold"
15 Hello. In the new printer, a syntax error is recorded
16 with regard to the "bold" means. In order to resolve
17 the problem, a CST 104 is created with the following
18 entry, namely find "bold" and replace it with "dark".
19

20 The CST 104 is sent to the printer to enable
21 the PAA 118 to use it. Thereafter, the original data
22 stream to the new printer 114 is provided.
23

24 The PAA 118 finds no match for the print
25 section of the data stream so it passes the data
26 unmodified to the printer language controller 120. The
27 PAA 118 finds a match with the word "bold" and performs
28 a specified action which in this case is replacement by

1 the "dark" command. Hence, the data dark is sent onto
2 the printer language controller.

3
4 Finally, no match is found with Hello and so
5 the PAA 118 passes this data unmodified to the printer
6 language controller 120. The net result of the PAA 118
7 is to create the data stream print "dark" Hello as
8 detailed in the diagram in the showing of Figure 6.

9
10 The final result with the use of the PAA 118
11 now yields the results that are the same as shown in
12 Figure 7 with both the older printer with the legacy
13 printer program 110 and the new printer.

14
15 Figure 8 shows a printer without the PAA 118.
16 Figure 9 shows a printer with the PAA 118. Looking more
17 specifically at Figures 8 and 9, it can be seen that the
18 PAA 118 module that is inserted into the printer system
19 architecture is done to a code at a location where the
20 emulation that processes the host data receives the data
21 from the host interface driver. All data passes this
22 location independent of the active interface (parallel,
23 serial, etc.).

24
25 The CST bundle 104 configures the PAA 118
26 module in the processor. The bundles are created and
27 downloaded to the printer using a tool in the form of
28 the PMS 102. At this point, the CST 104 is stored in

1 the printer's flash file system or non-volatile memory
2 116.
3

4 Thereafter, the PAA module 118 in the program
5 is used to adapt the printer 114 to a host application
6 or the specific legacy print job 110. This is achieved
7 by modifying the data (sent by the host application to
8 the printer) so that the printer emulation correctly
9 interprets the host data and prints the expected output.
10

11 From the foregoing, it can be seen that this
12 invention incorporates a broad spectrum of the ability
13 to use a prior or legacy print job 110 with new printers
14 or systems of printers and plural printers in various
15 networks.
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